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H4T TDAA T121

(56) Documents cited

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EP 0075673 A1

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TDCA TDGA

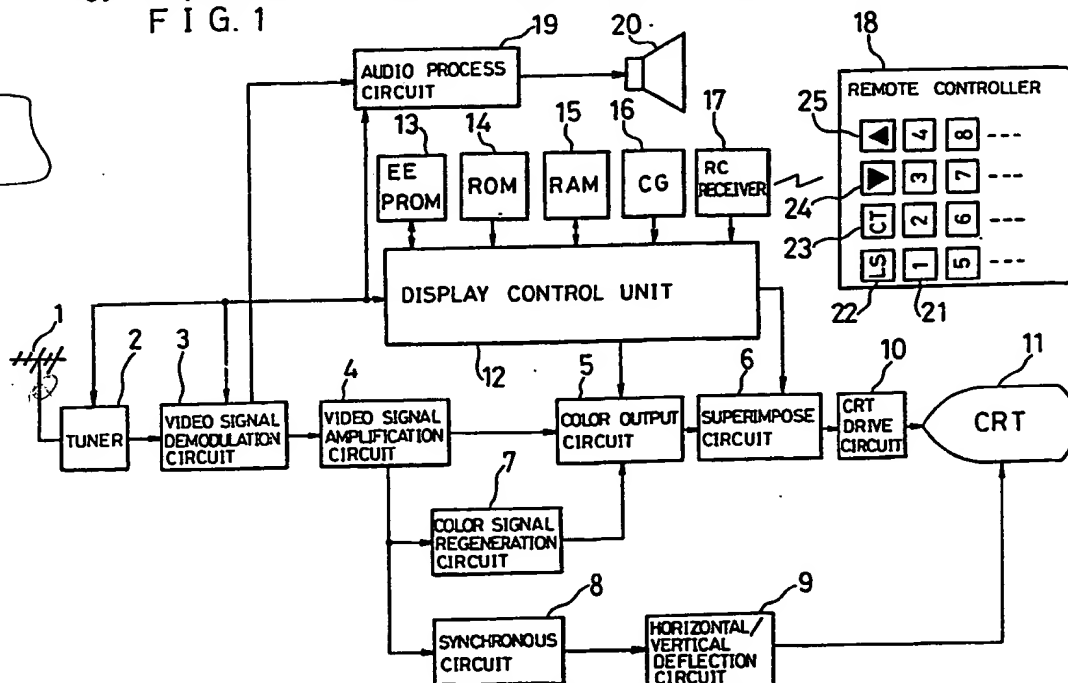
INT CL<sup>6</sup> G06F, H04N

Online databases: WPI

(54) Display control apparatus in television receiver

(57) A display control apparatus displays characters in a selected language superimposed on a television display. It comprises a ROM, a language select key and a display control unit. The ROM stores equivalent character information in a plurality of languages. The language select key selects the language of the on-screen character display. The display control unit reads character information corresponding to the language selected by the language selection key from the ROM to generate the according display. Another display control apparatus comprises a ROM, a replaceable EEPROM and a display control unit. The ROM stores equivalent character information in a plurality of languages. The EEPROMs store flags identifying languages for selection. The display control unit reads character information corresponding to a desired language stored in the ROM as directed by a flag stored in the installed EEPROM and generates display characters accordingly. A simple structure thus enables the selection of a display language from among a plurality of languages.

FIG. 1



This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

GB 2 257 000 A

FIG. 1

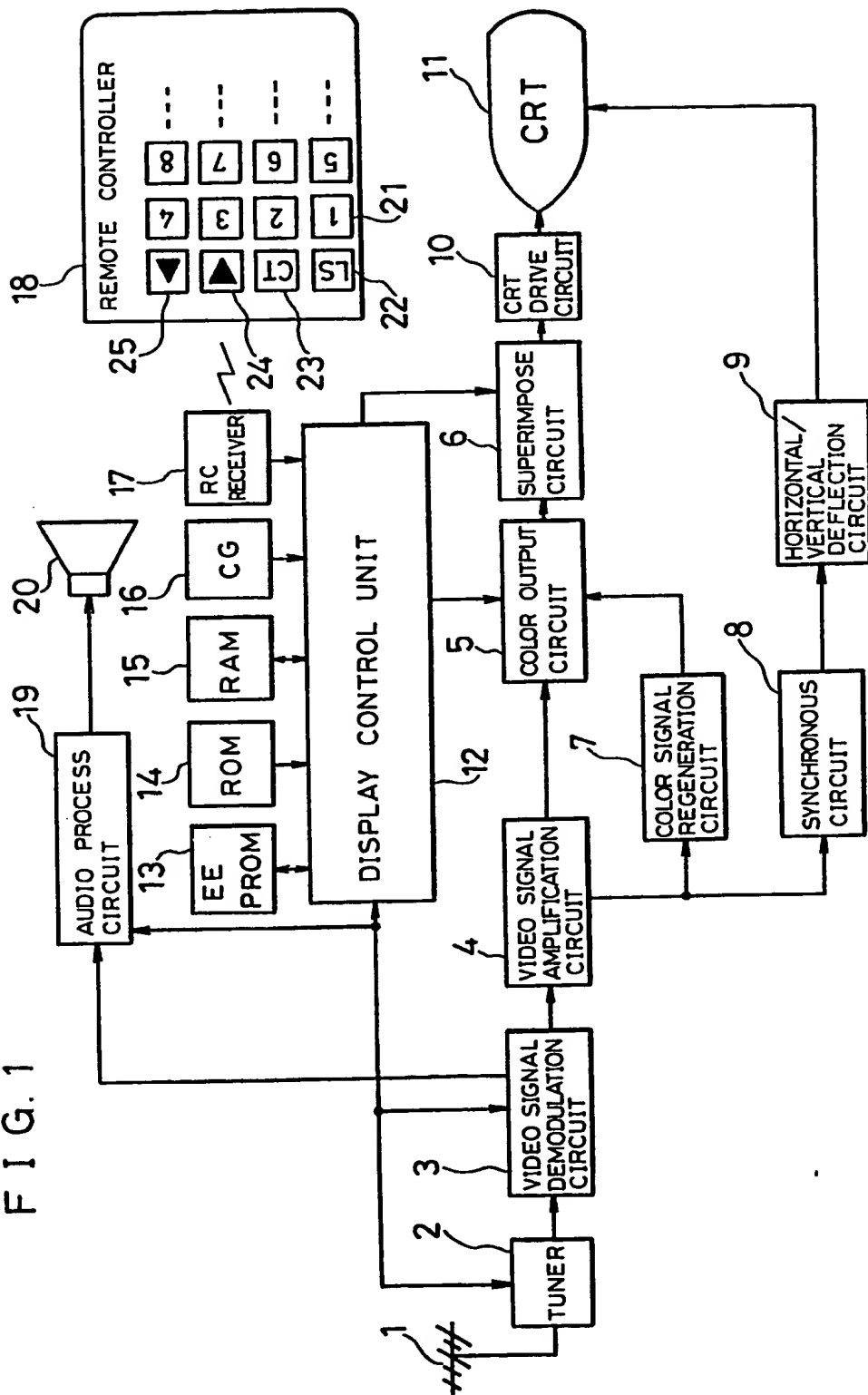


FIG. 2

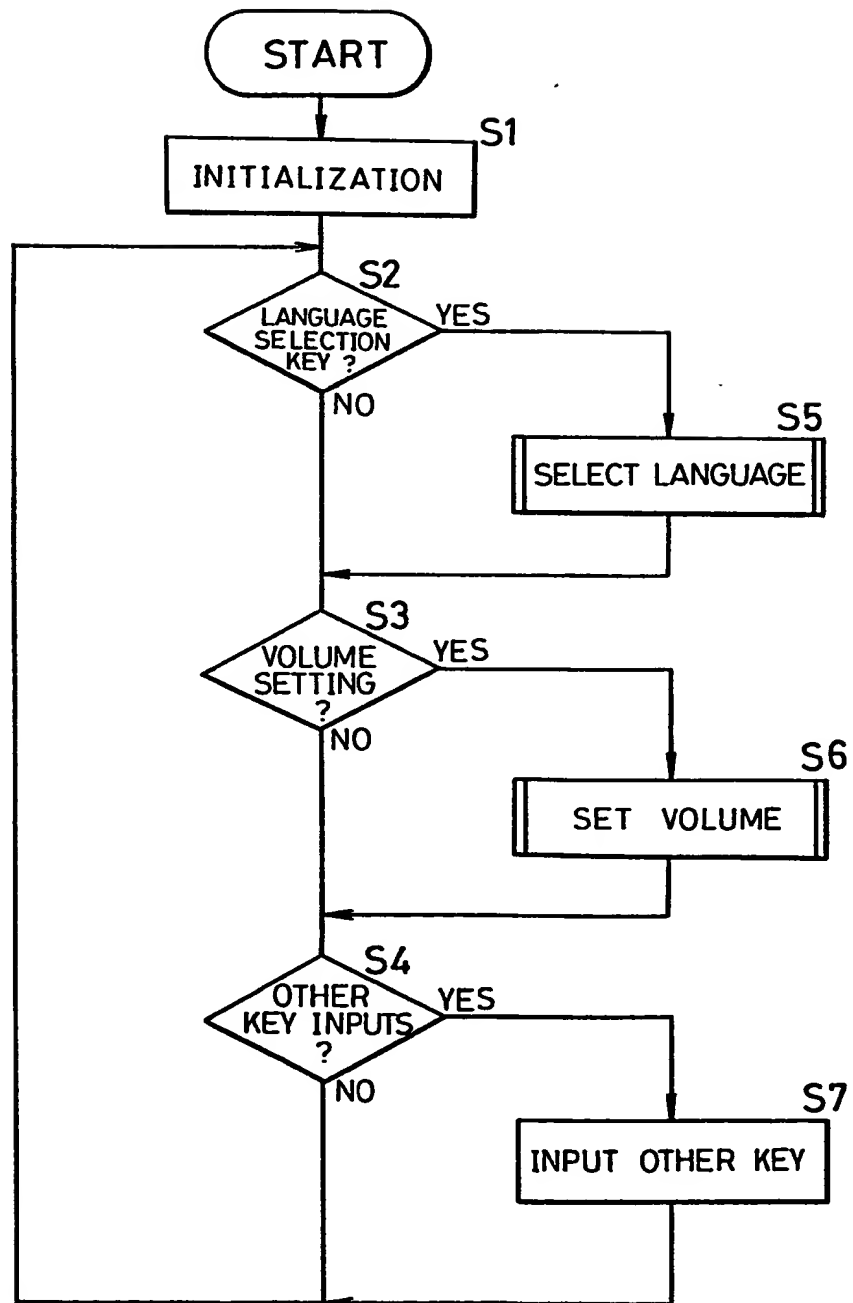


FIG. 3

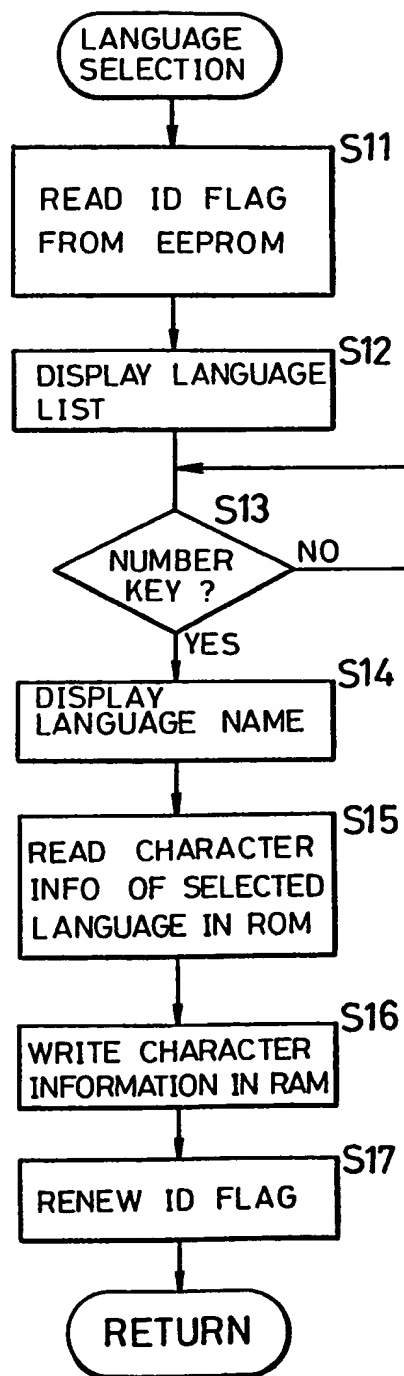


FIG. 4

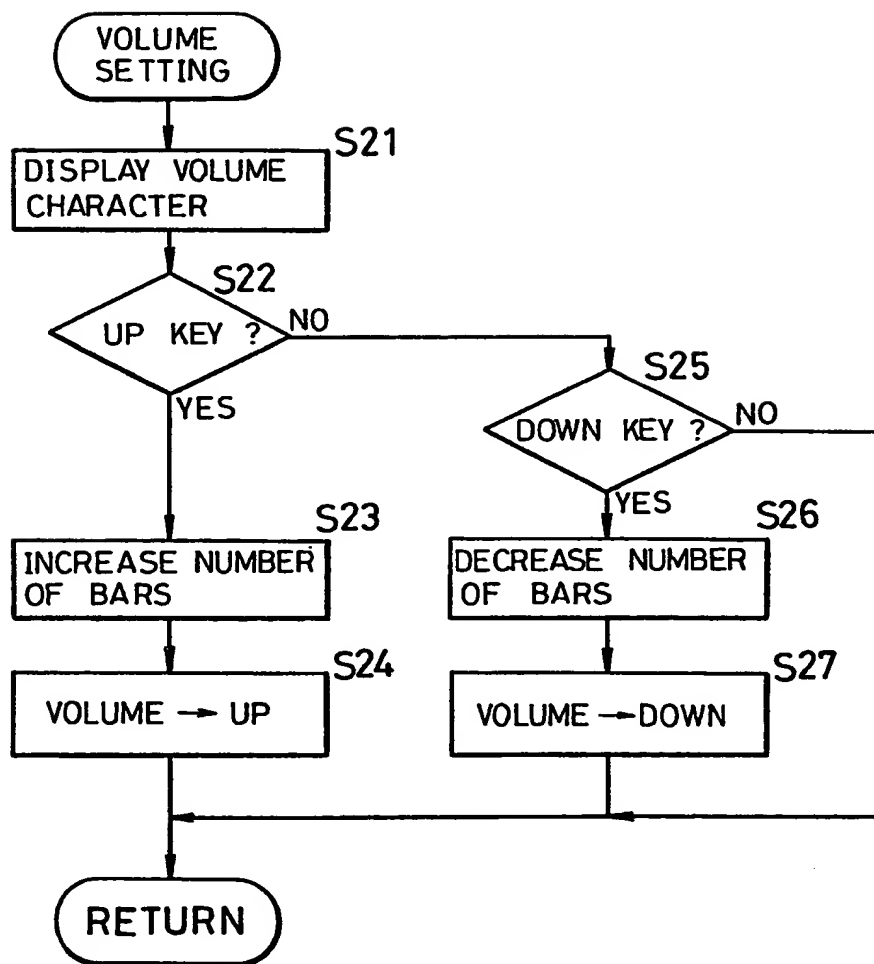


FIG. 5

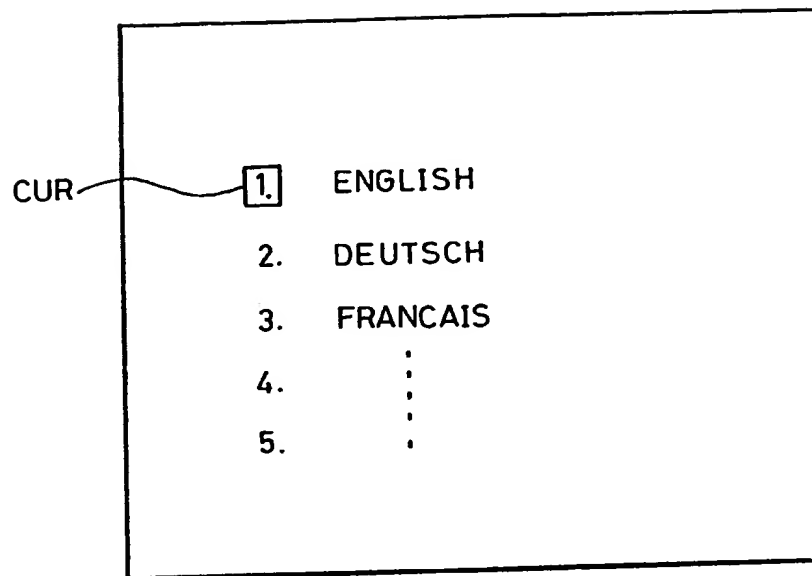


FIG. 6

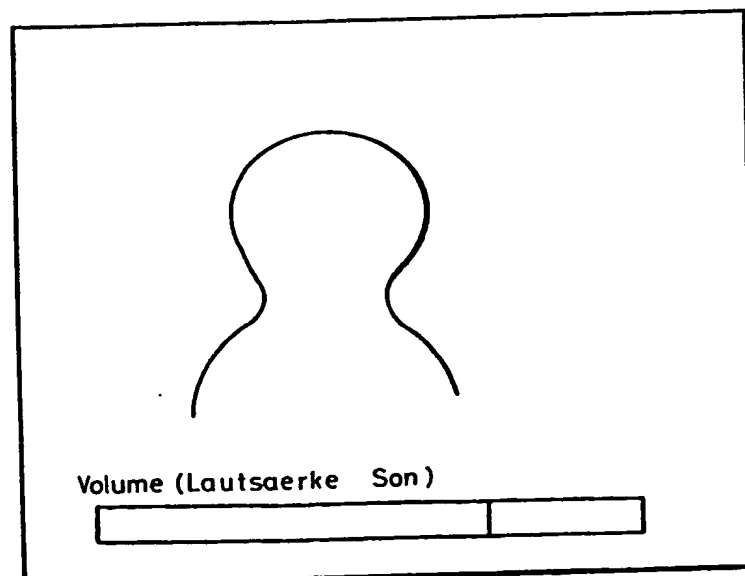


FIG. 7

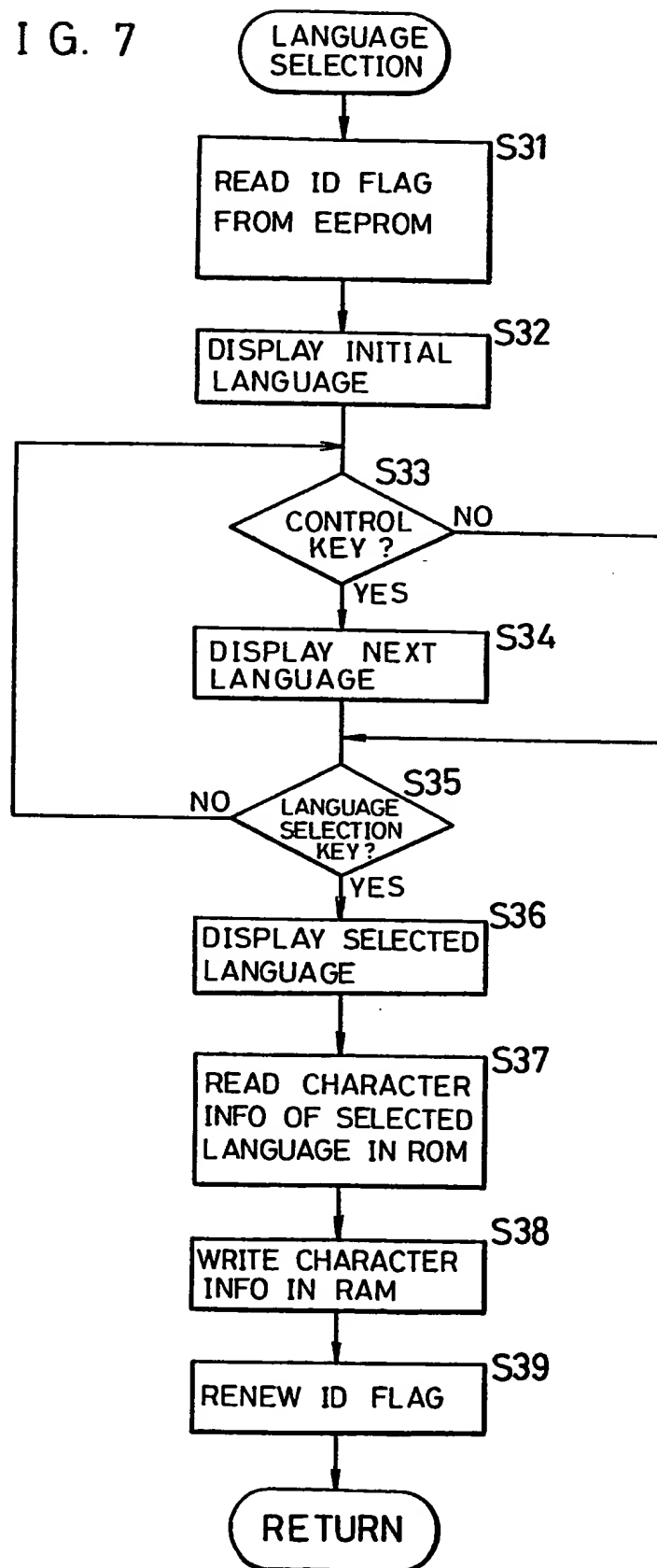


FIG. 8

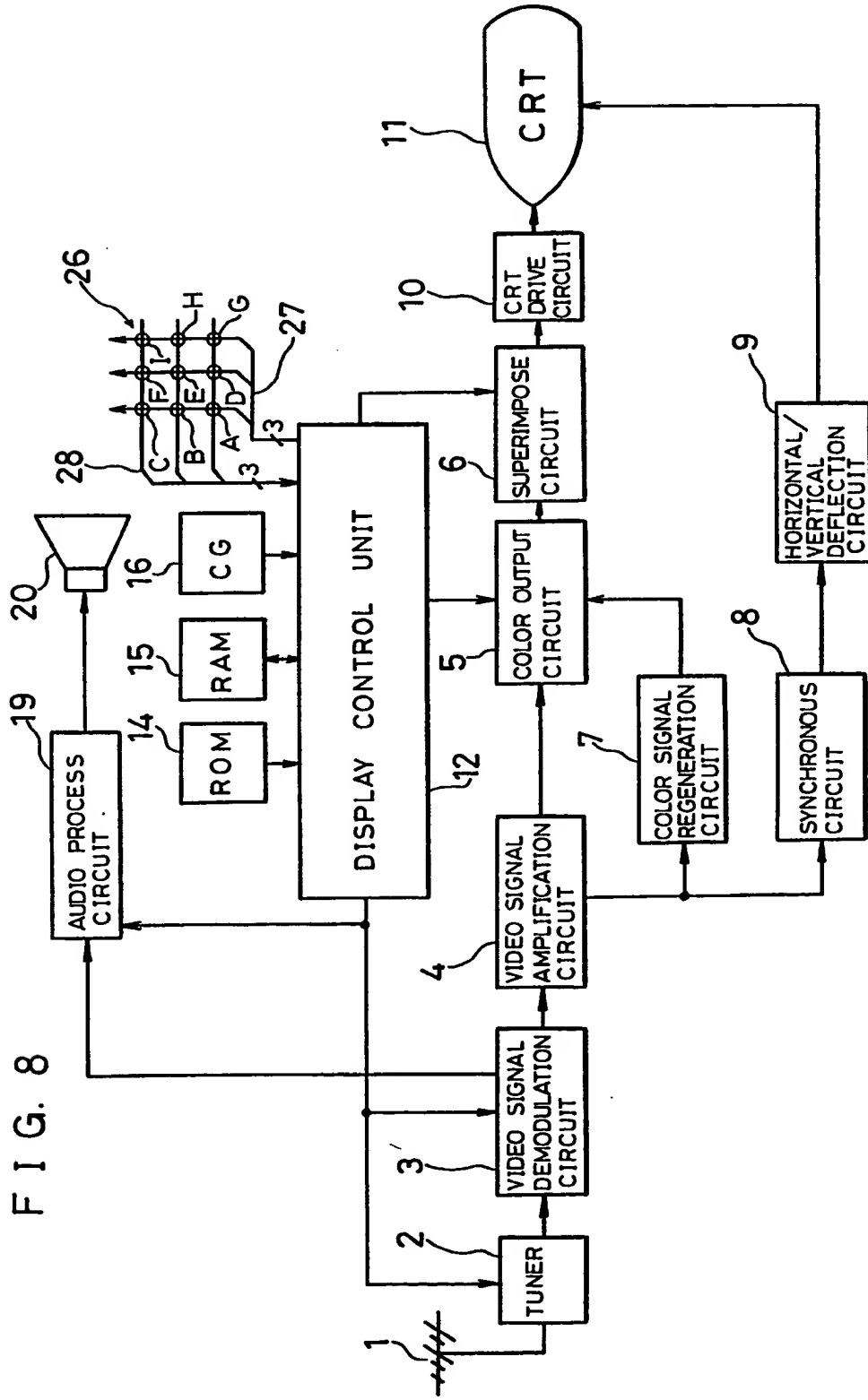
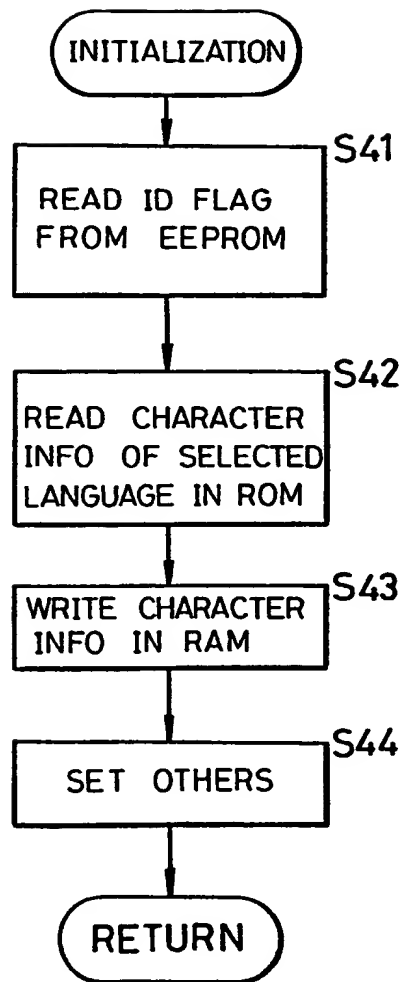




FIG. 9



## TITLE OF THE INVENTION

Display Control Apparatus in Television Receiver

## BACKGROUND OF THE INVENTION

The present invention relates generally to a television receiver display control apparatus. More specifically, it relates to a character display control apparatus for on-screen display of alpha-numeric or other characters in a given language selected from among a plurality of languages.

Television receivers are known to include an on-screen display capability which displays the operation of a remote controller. For example, when a "volume-up" key of the controller is pressed, the characters "VOLUME" and bars whose number is relative to the present volume are displayed on the receiver screen. If the volume-up key remains pressed, the number of display bars increases, corresponding to the increase in volume. Thus, a television viewer is readily apprised of the operation of the remote controller by a glance at the on-screen display.

The language in which the controller operation information is displayed is set into the television receiver system according to the country to which the television receiver is to be shipped. (For example, English is set for television receivers destined for Britain, French for France, and German for Germany.)

Conventionally, the designation of a specific language for the on-screen display is realized by installing a language

display device containing a given microcomputer corresponding to a given language into the television receiver system.

Each of the different language display devices, however, requires different types of hardware, since in addition to the specific microcomputers associated peripheral devices are additionally necessary. Such language-specific devices are expensive to develop and necessitate complex handling in production. Moreover, once it is selected, the display language of the conventional on-screen display device cannot be practicably altered: Particularly, television receivers manufactured by lot are not thus suitable for shipment to any country in which a language different from that for which the language display device is set is spoken.

#### SUMMARY OF THE INVENTION

It is an object of the present invention to provide for the ready selection of a language of on-screen character display from among a plurality of languages in a simple structure display control apparatus of a television receiver.

It is thus a further object to enable a single television unit to be fully applicable among a number of countries having different languages.

A display control apparatus according to an aspect of the present invention displays characters in a specified language on a television screen. It comprises memory means, language

selection means, and display means. The memory means stores equivalent character information in a plurality of languages. The language selection means selects a language of character display. The display means reads that character information corresponding to the language selected by the language selection means stored in the memory means. Therefore, the ready selection of a given language from among character information corresponding to a plurality of languages and the according character display is realized using only a single system of hardware.

A display control apparatus according to the invention in a further aspect comprises character information memory means, replaceable identification information memory means, and display means. The character information memory means stores equivalent character information in a plurality of languages. The identification information memory means stores identification information for identifying a desired language in storage. The display means reads character information of a desired language as stored in the character information memory means, in accordance with identification information stored in an installed identification information memory means. Therefore, by replacing the identification information memory means, and thereby selecting one language from among a plurality of languages for display, the language of the characters displayed on the television screen is readily changed.

The foregoing and other objects and advantages of the present invention will become more apparent from the following detailed description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram illustrating the structure of a television receiver to which a display control apparatus according to a first embodiment of the present invention is installed;

Fig. 2 is an overall flow chart illustrating the display control apparatus control process;

Fig. 3 is a flow chart illustrating a language selection process therein;

Fig. 4 is a flow chart illustrating a volume set process;

Fig. 5 shows an example of a display during language selection;

Fig. 6 shows an example of display during a volume-adjust operation;

Fig. 7 is a flow chart illustrating a language selection process according to a second embodiment of the present invention;

Fig. 8 is a block diagram of a television receiver to which a display control apparatus according to a third embodiment of the present invention is installed; and


Fig. 9 is a flow chart illustrating an initialization process according to a fourth embodiment of the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

##### I. First Embodiment

Referring to Fig. 1, an antenna 1 receives television signals and applies them to a tuner 2. The tuner 2 selects and amplifies the television signals and converts them to the intermediate frequency signals (for example; video 58.75MHz, audio 54.25MHz). The converted intermediate frequency signals are applied to a video demodulation circuit 3, which includes a video intermediate frequency amplification circuit, amplifies the converted intermediate frequency signals and demodulates color television signals from the amplified intermediate frequency signals. The color television signals are applied to the video signal amplification circuit 4, the audio signals are applied to the audio process circuit 19. The video signal amplification circuit 4 amplifies the color television signals demodulated at the video demodulation circuit 3.

The audio process circuit 19 includes an audio demodulation circuit, an audio intermediate frequency amplification circuit, an audio FM demodulation circuit, and an audio amplification circuit. The audio demodulation circuit demodulates the audio intermediate frequency signals, and then the audio frequency.



intermediate amplification circuit amplifies these signals, and the audio FM demodulation circuit demodulates the audio signals in low frequency from the amplified audio intermediate frequency signals. The audio amplification circuit amplifies these demodulated output signals, which are applied to a speaker 20 wherein they are output as an audio speech.

The color television signals amplified at the video signal amplification circuit 4 are distributed to a color output circuit 5, a color signal regeneration circuit 7 and a synchronous circuit 8 which is composed of a synchronous separation circuit, a synchronous amplification circuit, and a frequency separation circuit for taking out horizontal/vertical synchronous signals from the amplified color television signals. The horizontal/vertical synchronous signals are applied to a horizontal/vertical deflection circuit 9, which scans the electron beam upper and down onto the display screen. That is, the horizontal/vertical deflection circuit 9 applies the saw tooth pulse synchronous with the vertical synchronous signals to a deflecting coil (not shown) of CRT 11, whereby deflecting the electron beam in the CRT 11. The circuit 9 also generates a pulse at 15.75kHz synchronous with the horizontal synchronous signals and generates a horizontal deflection current by using said pulses as a drive pulse and applied it to the CRT 11, whereby the electron beam is scanned right and left onto the display screen.

A color signal regeneration circuit 7 generates color-difference signals to be applied to the CRT 11, reproducing the color image. The color-difference signals are applied to the color output circuit 5, to which the television signals amplified at the video signal amplification circuit 4 are applied as luminance signals. The color output circuit 5 matrixes the luminance signals and the color-difference signals so as to generate three primary color signals such as red (R), green (G) and blue (B). The primary color signals are amplified sufficiently to drive the CRT 11 and are applied to a superimpose circuit 6. The superimpose circuit 6 superimposes character information received from a display control unit 12 ( detailed shortly ) onto the primary color signals and applies the composite signal to a CRT drive circuit 10. The CRT drive circuit 10 drives an electron beam gun in the CRT 11, controlled according to the primary color signals applied.

The display control unit 12 consists of a microcomputer, and it generates and outputs the character information to be displayed by the CRT 11. The display control unit 12 is equipped to apply control signals to the tuner 2, the video demodulation circuit 3, the color output circuit 5 and the audio process circuit 19 and to receive detection signals which indicate the states of the respective components. An EEPROM 13, a ROM 14, a RAM 15 a character generator (CG) 16 and a RC receiver 17 are each connected to the display control unit 12. The EEPROM 13



includes flags identifying which is the language identification of the character information to be displayed. The ROM 14 stores character information of equivalent content in a plurality of languages, as well as display control programs. The RAM 15 receives the character information of a selected language. The CG 16 contains alphabets and symbols from various languages. The RC receiver 17 receives instructions sent from the remote controller 18.

The remote controller 18 comprises a language select key 22, a control key 23, a volume-down key 24, a volume-up key 25, and a numeric keys 21. The language select key 22 is used to select a language in which character information is to be displayed. The volume-up key 25 and the volume-down key 24 are used to instruct increase or decrease in the volume. The control key 23 is used for various control inputs. The numeric keys 21 are used to select channels and so on.

The character display control operation of a television receiver incorporating this embodiment will hereinafter be described, with reference to the display control process flow chart of Fig. 2.

When a power source (not shown) is turned on, an initialization is carried out at step S21, essentially in which, the EEPROM 13 and the RAM 15 are initialized. During initialization, the flag identifying English is set in the EEPROM 13.

At step S2, it is determined whether or not the language selection key 22 in the remote controller 18 has been operated. At step S3, it is determined whether or not either the volume-up key 25 or the volume-down key 24 of the remote controller 18 has been operated. At step S4, it is determined whether or not there is input from other keys, and if the determination is "NO" the program returns to the step S2.

If the language select key 22 has been operated, the program proceeds from step S2 to step S5. At step S5, a language selection process is carried out and then the program proceeds to step S3. If either the volume-up key 25 or the volume-down key 24 has been operated, the program proceeds from step S3 to step S6. At step S6, the volume is adjusted according to whether key 24 or 25 has been operated and then the program proceeds to step S4. At step S4, if there is input from other keys, the program proceeds to step S7, at which the process according to set key input is carried out.

Referring now to the flow chart of Fig. 3 showing the language selection process at step S5, at step S11, the set identification flag is read from the EEPROM 13, having been set to English during initialization. At step S12, a list of languages selectable is displayed on the CRT 11. Fig. 5 shows an example of the list display, wherein the name of each given language is displayed to the side of numbers 1 to 5 respectively. for example, English in the first position, German the second.

and French the third. A cursor CUR flashes on and off over the number 1. The cursor CUR represents the display language currently set--English in this case, as shown in Fig. 5. At step S5, it is determined whether or not the operator of the remote controller has pushed any of the numeric keys 21. The program thus awaits language selection by numeric key 21 input, and after that proceeds to step S14.

At step S14, the language corresponding to the input numeric key input is displayed on the screen. For instance, if German is selected, "DEUTSCH" is displayed on the CRT.11. At step S15, the character information corresponding to the language selected by the input numeric key 21 is read from the ROM 14. At step S16, the read character information is written into the RAM 15. At step S17, a new identification flag is set in the EEPROM 13; in this example, that which identifies English is replaced by one identifying German. At the end of step S17, the program returns to the main routine.

Referring is now made to the flow chart of Fig. 4, showing the volume-setting process at step S6. First at step S21, the character information representing the volume is read from the RAM 15 and is displayed on the CRT 11. Fig. 6 is an example of the display wherein a term signifying volume ("Volume" in English, "Lautsaerke" in German, "Son" in French) is displayed, and a bar display indicating the current degree of volume appears in the lower part of the display, in addition to the image.

At step S22 and step S25, it is determined whether either the volume-up key 25 or the volume-down key 24 has been operated. If the former is the case, i.e. "Yes" at step S22, the program proceeds to step S23, at which the number of the bars displayed on the lower part of the display is increased. At step S24, the display control unit 12 delivers control signals to the audio process circuit 19 in order to increase the volume. Likewise, if it is determined at step S25 that the volume-down key 24 has been pressed, the program proceeds to step S26. The number of the display bars is decreased at step S26, and the display control unit 12 delivers control signals to the audio process circuit 19 in order to decrease the volume at step S27. After the operation at step S27, the program returns to the main routine.

In the aforementioned process, since the identification flags are stored in the EEPROM 13, which is a non-volatile memory, the status of an identification flag remains unchanged by power shut-off. Accordingly, it is not necessary to set or reset the language of choice each time the power source is turned on.

## II. Second Embodiment

The language selection flow chart of Fig. 7 corresponds to the flow chart of Fig. 3. In the second embodiment, after the language select key 22 is pressed to put the apparatus into only the select mode, only the presently-set language is displayed, whereas all selectable languages are displayed on the

television display in the aforementioned first embodiment. The language is selected after calling up the displayed language names in succession by using the control key 23.

At step S31, the identification flag in the EEPROM 13 is read. At step S32, the name of the language for which the apparatus is currently set by the identification flag is displayed. At step S33, it is determined whether or not the control key 23 has been pressed. If it has, the program proceeds to step S34, where a next language in succession is displayed. The ROM 14 stores character information of the given languages in ordered succession, for example, English, German, French and so on. Thus the successive languages are displayed according to this order as they are called up at step S34. Then, at step S35, it is determined whether the language select key 22 has been pressed again or not, wherein the language select key 22 is used to instruct the completion of language selection. If the language select key 22 has not been pressed, the program returns to step S33. At step S33, if it is found that the control key 23 has not been pressed, the program proceeds to step S35.

If the language selection key 22 has been pressed, the program proceeds from step S35 to step S36. At step S36, the selected language is displayed on screen. At step S37, appropriate character information read from the ROM 14 is written into the RAM 15. At step S39, the flag stored in the EEPROM 13 is replaced by the flag identifying the selected language.

Subsequently, the program returns to the main routine shown in Fig. 2. The further structure, and other relevant operations of this embodiment are similar to those of the first embodiment, and hence their description is omitted.

### III. Third Embodiment

A jumper switch is employed to select a language in this embodiment, in contrast to the aforementioned two embodiments, in which language is selected through the remote controller 18.

Fig. 8 is a block diagram showing an embodiment of a television receiver to which a character display control apparatus according to the third embodiment is applied. In this embodiment, the EEPROM 13 is unnecessary. The remote controller 18 and its RC receiver 17 do not need to be used to select the language. Explanation of that part of this embodiment in common with the first embodiment is hereinafter omitted.

Three output lines 27 which outputs pulse signals of different phase when a reset signal is input, are connected to the display control unit 12. Three input lines 28 crossed over the output lines 27 are connected to the display control unit 12 as well. At one or more of nine intersections A to I a jumper switch 26 is provided, to thus connect a pair of the input/output lines at one point among the intersections A to I. Intersection connect and disconnect modes provide selection between two languages. For example, if only intersection A in connection English might be selected, and alternatively, if only

intersection A is in disconnection German might be selected. And further, intersection B connection might select French and its disconnection select Italian. The existing connection point(s) of the intersections are detected by a quick-reset signal. Consequently, one of the languages stored in the ROM 14 is selected and written into the RAM 15. This operation is carried out during initialization, at step S1 of Fig. 2. Thus, the selection of a language by the language selection key at step S2 therein and the language selection process executed thereafter at step S5 becomes unnecessary.

In this embodiment, it is possible to select the language option by changing the configuration of the jumper switch(es).

#### IV. Fourth Embodiment

In the aforementioned three embodiments, either the language selection key 22 of the remote controller 18, the control key 23 or the jumper switch 26 is employed to select a language. However, in this embodiment, the EEPROM 13 is replaceable and stores a flag which identifies the language to be selected, whereby the display control unit 12 is directed to read the corresponding character information from the ROM 14 and write it into the RAM 15.

Turning now to the flow chart of Fig. 9 in the initialization process illustrated therein at step S41, the program reads the flag in the installed EEPROM 13. At step S42, the character information in the ROM 14 corresponding to the

selected language is read according to the indication of the flag. At step S43, the read character information is written into the RAM 15. At step S44, the program sets other conditions and returns to the main routine. In this embodiment, steps to determine whether a language selection key has been operated, as at step S2 of the main routine in the first embodiment, and the ensuing language selection process at step S5 therein are not needed, just as they are unnecessary in the third embodiment.

#### Modifications

(a) In the aforescribed four embodiments, the ROM stores character information for a plurality of languages, and the display control unit is used to select the character information corresponding to one language in order to write it into the RAM. The character information alternatively may be read directly from the ROM upon each instance of displaying.

(b) The language select key and the control key which are components of the remote controller 18 in the first and second embodiments may instead be mounted directly in the television receiver.

(c) A DIP switch may be used for language selection instead of the jumper switch in the third embodiment.

(d) In the fourth embodiment, the replaceable EEPROM stores the flags and the ROM stores the character information corresponding to each of the available languages. If the ROM storing the character information corresponding to a given



language is replaceable, the EEPROM would then be unnecessary.

Various details of the invention may be changed without departing from its spirit nor its scope. Furthermore, the foregoing description according to the present invention is provided for the purpose of illustration only, and not for the purpose of limiting the invention as defined by the appended claims and their equivalents.

What is claimed is:

1. A display control apparatus in a television receiver for displaying characters in a specified language on a television display, comprising:

memory means for storing equivalent character information in a plurality of languages,

means for selecting a language to be displayed on said television display,

means for reading that character information which corresponds to the language selected by said language selection means from said memory means and for displaying said character information on said television display.

2. A display control apparatus according to claim 1, wherein said memory means includes means for storing equivalent character information in a plurality of languages, means for storing identification information by which the language selected by the language selection means is identified, and means for storing the character information corresponding to the language selected by said language selection, which information is to be read by said display means.

3. A display control apparatus according to claim 2, wherein said language selection means includes:

means for displaying on said television display a list of names of a plurality of languages stored in said memory means wherein each of said names is written in the language of that

name,

means for selecting one language name from said plurality of language names listed, and

means for reading the character information corresponding to the language selected by said name selection means from said memory means and for writing said language character information into said character information memory means.

4. A display control apparatus according to claim 3, wherein said display means includes a superimpose circuit for superimposing character information read from said character information memory means onto video signals.

5. A display control apparatus according to claim 4, further comprising:

a remote controller capable of transmitting signals according to key input from a plurality of input keys contained in said remote controller; and

a remote-control receiver for receiving the signals transmitted by said remote controller; and wherein

said name selection means is located in said remote controller.

6. A display control apparatus according to claim 2, wherein said language selection means includes change-display means for sequential display of language names of the languages identified by the identification information stored in said identification information memory means, in the languages of each of said names

on said television display, selection determination means for concluding the selection of a language form among said sequential display, and means for reading character information corresponding to the language as selected by said selection determination means from said memory means and storing it into said character information memory means.

7. A display control apparatus according to claim 6, further comprising:

a remote control transmitter having a plurality of input keys and transmitting signals according to input from said keys; and

a remote-control receiver for receiving the signals transmitted by said remote control transmitter; and wherein

said change-display means and said selection determination means are each allocated to one of said plurality of keys in said remote control transmitter.

8. A display control apparatus according to claim 1, further comprising:

a remote control transmitter having a plurality of input keys, for transmitting signals according to input from said keys,

a remote-control receiver for receiving the signals transmitted by said remote control transmitter; and wherein

said language selection means selects a language to be displayed according to at least one of key inputs from said input keys.

9. A display control apparatus according to claim 1, wherein said language selection means includes a jumper switch for selecting character information corresponding to one language from said memory means.

10. A display control apparatus in a television receiver for displaying characters in a specified language on a television display, comprising;

means for storing equivalent character information in a plurality of languages,

replaceable means for storing identification information for identifying a desired language from among said plurality of languages stored,

a display means for reading character information corresponding to a desired language stored in said character information memory means in accordance with identification information stored in said replaceable identification information storage means installed, and for displaying characters corresponding to said character information on said television display.

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**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

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GB 9210304.3

**Relevant Technical fields**

(i) UK Cl (Edition K ) H3Q (QBRX, QBRX), H4T (TDAA, TDCA, TDGA)

(ii) Int Cl (Edition 5 ) H04N, G06F

**Search Examiner**

KING

**Databases (see over)**

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

**Date of Search**

28 AUGUST 1992

Documents considered relevant following a search in respect of claims

1 TO 10

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2221127 A (PHILIPS) see abstract	1
X	GB 2207329 A (PHILIPS) see abstract	1
X	GB 1586431 (PHILIPS) see abridg	1
X	GB 2171279 A (MULTITECH) see abstract	1
X	EP 0075673 A1 (IBM) see abstract	1

Category	Identity of document and relevant passages	Relevant to claim(s)

#### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

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**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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